NORTHERN NEVADA ADULT MENTAL HEALTH SERVICES

POLICY AND PROCEDURE DIRECTIVE

SUBJECT: BLOOD GLUCOSE TESTING

NUMBER: NN-LB-05

ORIGINAL DATE: 06/06/89

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APPROVAL: Rosalyne Reynolds *{s}*, Agency Director

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I. PURPOSE

The purpose of this policy is to establish procedures for on unit blood glucose testing utilizing a simplified blood glucose meter method. The blood glucose meter testing will be used to monitor treatment and as a diagnostic guide.

II. POLICY

It is the policy of Northern Nevada Adult Mental Health Services (NNAMHS) to have blood glucose meters and appropriate supplies available and the nursing staff trained in their use. Only one method/meter will be used throughout the facility.

III. DEFINITIONS

1. Programming - A type of calibration in which the meter's electronics are set to match the strips of Glucometer Elite being used.
2. Check test - A method used to check meter performance.
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3. Control testing - A method used to verify that the user's technique is correct and that the meter system is working properly.
4. Controls - Solutions containing known amounts of glucose that are utilized as part of the control testing procedure.
5. Finger stick procedure - A method whereby a blood sample required for testing may be obtained.
6. Autolet and Lancet - A commercial device utilized in the finger stick procedure to secure the blood sample.
7. Maintenance - A method of cleaning the meter to insure accurate and reliable operation of the instrument.
8. Troubleshooting - A systematic way of isolating a problem and determining what is needed to correct it.
9. Battery - A source of power generated to allow the meter to work properly.

IV. REFERENCES

1. National Committee for Clinical Laboratory Standards. Ancillary blood glucose testing in acute and chronic care facilities; Tentative Guideline. NCCLS Document C30-T {ISBN 1-56238-126-1}. NCCLS, 771 East Lancaster Avenue, Villanova, Pennsylvania, 19085. 1991.
2. Tietz, N.: Fundamentals of Clinical Chemistry, 2nd Ed., W.B. Saunders Co., Philadelphia, PA; 1976, p. 243; and 3rd edition 1987, p. 42;9.
3. Tietz, N.: Fundamentals of Clinical Chemistry, 3rd Ed., W.B. Saunders Co., Philadelphia, PA; 1987, p. 427.
4. Atkin, S., Jaker, M.A., Chorost, M.I., Reddy, S.: Fingerstick Glucose Determination in Shock., Annals of Internal Medicine, 1991, 114: 1020-24.
5. National Diabetes Data Group: "Classification and Diagnosis of Diabetes Mellitus and Other Categories of Glucose Intolerance," Diabetes 28, 1039-1057.

6. Henry, John Bernard M.D.: "Clinical Diagnosis and Management by Laboratory Methods," 17th Ed., p. 1433, 1984.
7. Diabetes Update Ames Glucosystem, 1994.
8. Quality Assurance Resource Program, the Center for Diabetes Education, 1988.
9. Quality Assurance In-service Manual, the Center for Diabetes Education, 1988.

V. PROCEDURE

1. GLUCOSE TESTING MATERIALS
   a. Blood Glucose meter
   b. Glucometer Elite reagent strips (package of 50 or 100's)
   c. Autolet device and lancet
   d. Alcohol swabs
   e. Facial tissue
   f. Examination gloves
   g. Glucometer Elite
2. THE CHECK PADDLE TEST
   a. To assure Quality Control, it is important to check the instrument electronics at the beginning of each shift using the Check Strip.
   b. Remove the Check Strip from the plastic box. Avoid touching the Meter end of the Check Strip.
   c. Insert the Check Strip fully into the Meter (with tab toward top of the Meter). A double "beep" will sound and the power will automatically turn on. The Check Test result will then appear in the Display Window.
   d. If the display reading is within the range listed on the Check Strip label insert, the Meter is functioning properly. If not, refer to Section 5 in the GLUCOMETER ELITE Operating Manual. Carefully remove the Check Strip from the Meter and replace it in the plastic box.

e. If the result still falls outside the range, failure of the meter electronics may be indicated and meter service should be requested. DO NOT USE METER UNTIL IT HAS BEEN REPAIRED.
    i. A Toll free service number is listed on the Service Information Card.
    ii. Notify the NNAMHS Laboratory.

3. CODING CALIBRATION PROCEDURE
    a. Each lot of GLUCOMETER ELITE Test Strips is tested extensively and assigned a Function Number (0-12) identified on the Code Strip included with each package of Test Strips. This Code Strip is used to match the Meter to the reactivity of the Test Strips to be used.
    b. Open the new carton of Test Strips and find the clear plastic packet containing the Code Strip.
    c. Carefully tear open the packet and remove the Code Strip. Save the packet to store the Code Strip. Avoid touching the Meter end of the Code Strip.
    d. Insert the Check Strip fully into the Meter (with tab toward top of the Meter). A double "beep" will sound and the Code (Function) Number (e.g., F-5) will appear in the Display Window.
4. CONTROL TEST PROCEDURE
    a. To assure the accuracy of test results, run control tests each shift when consumer testing is done, using GLUCOMETER ELITE low and High Control Solutions with GLUCOMETER ELITE Test Strips. Use of controls can alert you to the following problems:
        i. Test strips may have deteriorated (due to exposure to air and humidity).
        ii. The testing procedure (e.g., sample too small) was not performed correctly.
    b. Perform the control test as follows:
        i. Remove foil packets from carton and tear off single packet.

ii. Carefully peel to the line. Fold back the foil ends to expose the Meter End of the Test Strip. Avoid touching the meter end of the Test Strip.

iii. Hold the test end of the Test Strip between the foil and with the tab facing toward the top of the meter; insert the strip fully into the meter.

iv. A "beep" will sound and the Code (Function) Number and previous test result will begin flashing in the Display Window. Remove the foil from the strip. The Code Number must match the number on the GLUCOMETER ELITE Test Strips.

v. Hold the bottle on a slant, with the tip near the end of the Test Strip. Gently squeeze the bottle and form a small drop. Touch and hold the Test End of the Test Strip to the hanging drop until after the Meter "beeps."

vi. A small amount of solution will be drawn into the Test Strip. The timer begins counting down from "30" seconds.

vii. After 30 seconds, the Control Test result will appear in the Display Window. Compare the result to the range listed on the bottom of your Test Strip Carton.

A) If a problem ever occurs during testing that you cannot solve, refer to the Troubleshooting section of the Operating Manual or call the NNAMHS Lab Manager.

B) If you still cannot identify the problem, contact the Bayer Customer Service Department at 1-800-348-8100.

viii. Compare control results with the acceptable ranges:

A) Acceptable ranges are printed on each box of test strips.

B) Proceed as follows:

(1) Results in range, proceed with patient testing.

(2) Results out of range, repeat control tests, repeat check test and record that this was done on the Glucose Monitor Form 119.

(Appendix I)

(3) Results in range, record on Glucose Monitor Form (MR 119) and proceed with testing.

(4) Results still out of range and technique and procedure have been verified; consult the troubleshooting guide in the Glucometer manual. Call the NNAMHS Lab Manager if you cannot resolve the problem. DO NOT PROCEED WITH CONSUMER TESTING UNTIL THE PROBLEM IS CORRECTED.

C) Nursing staff will check the expiration dates on high and low controls and replace as necessary.

ix. Control results will be reported on the glucometer control sheet.

x. Controls expire 6 months after being opened. Newly opened control vials must be labeled with the date opened. The date must be verified before using the control. Any outdated control vial must be discarded. The controls expire on the manufacturer's expiration date or 6 months after the vial was opened, whichever comes first.

5. FINGERSTICK PROCEDURE

a. Select a puncture site:

i. The side of the fingertip is the preferred site.

ii. The site should be warm and must not be swollen.

iii. Blood flow can be increased to the site by holding a moist, warm cloth on the site for 3 minutes or by running warm water over the hands.

b. Cleaning the puncture site:

i. Use an alcohol wipe to clean the puncture site.

ii. Allow the site to dry while you load the autolet device.

A) This is important as excess alcohol can affect the blood glucose result.

c. Loading the Autolet Device:
    i. Insert a platform, with the recessed area down, into the Autolet.
    ii. Pull the Autolet arm back toward the activating button until it clicks and takes hold.
    iii. Insert the lancet into the Autolet arm and push it securely into position.
d. Performing the finger stick:
    i. Remove the protective disc from the tip of the lancet and set it aside.
    ii. Position the recessed area of the platform over the puncture site so that the skin protrudes through the platform hole.
    iii. Press the activating button, allowing the lancet to puncture the skin.
    iv. The drop of blood that forms should be used for the glucose test.
    v. Insert the used lancet into the protective disc. Discard both used lancet and platform into a Biohazard Sharps Container.

6. THE BLOOD GLUCOSE TEST PROCEDURE
    a. Remove foil packets from carton and tear off single packet. Code meter if this has not already been done.
    b. Carefully peel to the line. Fold back the foil ends to expose the Meter End of the Test Strip. Avoid touching the meter end of the Test Strip.
    c. Hold the test end of the Test Strip between the foil and with the tab facing toward the top of the meter; insert the strip fully into the meter.
    d. A "beep" will sound and the Code (Function) Number and previous test result will begin flashing in the Display Window. Remove the foil from the strip. The Code Number must match the number on the GLUCOMETER ELITE Test Strips.
    e. Obtain a drop of blood.
    f. Touch and hold the test end of the Test Strip to the drop of blood until after the Meter "beeps." Blood will be drawn automatically into the Test Strip. The timer will begin counting down from "30" seconds.

g. After 30 seconds, the blood glucose result will appear in the Display Window. If "low" appears in the display, the blood glucose may be below 40 mg/dl. If "Hi" appears, the result may be above 500 mg/dl.

h. Record the blood glucose results on the Blood Glucose Monitor Form (MR 119).

i. All blood glucose meter testing results below 50 mg/dl or above 350 mg/dl will be repeated. If the second result is also below 50 or above 350 the RN on duty will contact the attending or OD physician to see if he/she would like a follow-up laboratory glucose test. If laboratory verification is ordered by the physician the RN will contact the NNAMHS laboratory or LabCorp.

7. METER MAINTENANCE

a. DO NOT USE ALCOHOL or other organic solvents in cleaning any part of the instrument.

b. DO NOT ALLOW EXCESS water or detergent to run into the instrument when cleaning.

i. Water or detergent can damage internal components.

c. Instrument Exterior and Display Screen

i. Carefully wipe the instrument exterior and display screen with a soft, clean cloth or lens tissue moistened lightly with water.

ii. Do not use alcohol or solvents to clean the display screen as these will cause clouding of the screen to occur.

d. Handle the instrument with care

i. Dropping the instrument can cause internal disturbance, resulting in electronic malfunctions.

ii. Do not expose instrument to excessive humidity, extreme heat or cold, dust or dirt.

iii. Store the meter in the case provided whenever possible.

e. Battery Replacement
    i. When an arrow pointing to low battery appears on the display screen, replace the battery immediately.
    ii. Follow directions in the meter manual for battery replacement using two 3-volt lithium batteries.
f. Document meter maintenance on the "Monthly Maintenance and Check Test Log sheet" (Appendix II)

8. TROUBLESHOOTING
    a. Causes of problems
        i. Error in user technique.
        ii. Reagent strip deterioration.
        iii. Instrument not calibrated, not properly maintained or malfunctioning.
    b. Follow the troubleshooting chart included in the meter manual to systematically check for the problem.
    c. Call the NNAMHS Laboratory for assistance if the problem cannot be resolved
9. TRAINING, CERTIFICATION, COMPETENCY
    a. Training and Certification
        i. Personnel performing the blood glucose testing must be trained and certified. Personnel will be limited to RNs .
        ii. Training sessions at a minimum, will cover the following:
            A) Programming of the meter.
            B) Check test performance.
            C) Control testing performance.
            D) Finger sticking technique.
            E) Consumer testing
            F) Cleaning and maintenance of meter.
            G) Changing battery and troubleshooting problems.

H) Record keeping.

I) Description of the meter and its component parts.

J) Actual hands on use of the meter demonstrating participants understanding of the meter and its use.

iii. Documentation of the successful completion of the training will be placed in the participants personnel file.

iv. The Nursing Service Department will maintain a list of personnel who can perform the glucose on-unit testing.

A) List will be kept current and updated.

B) List will indicate which personnel have been certified to teach and train other personnel.

C) Retraining must be done at least yearly.

b. Competency:

i. Staff competency checks will be completed annually. Nurses who have not completed all portions of the competency successfully will not perform glucometer testing.

ii. Methods of checking competency shall include:

A) The Medical Technologist will observe each nurse using the glucometer.

B) A monthly review of log sheets ”Glucometer Controls”, meter maintenance records (Appendix II will be done by the NNAMHS Laboratory.

C) Each nurse will successfully complete testing on a blind specimen. The specimens will be assigned randomly by the Medical Technologist.

iii. Competency records will become a part of the nursing service personnel file.

VI. ATTACHMENTS

1. Glucose Monitor Form, 119
2. Meter Maintenance Record
3. Glucometer Controls